

CLAIMS

We claim:

1. An intervertebral spacer device comprising:
first and second plate members, each having first and second plate surfaces thereof, said plates being disposed in a spaced apart relationship such that first ones of said plate surfaces oppose one another, and second ones of said plate surfaces face in opposite directions; and
at least one restoring force providing element disposed between said first surfaces of said first and second plate members, and disposed such that a compressive load applied to said second surfaces of said first and second plate members is counteracted by said at least one restoring force providing element, said at least one restoring force providing element including at least one belleville washer having at least one radially spaced concentric groove and at least one spiral slot.
2. The device as set forth in claim 1, further comprising disposed on at least one of said first and second plate members a retaining wall in which said at least one restoring force providing element is contained.
3. The device as set forth in claim 1, wherein said at least one restoring force providing element includes a belleville washer having a narrow end and a wide end and being oriented such that said wide end is in contact with said first surface of one of said first and second plate members.
4. The device as set forth in claim 1, wherein said at least one radially spaced concentric groove in said at least one belleville washer comprises a plurality of radially spaced concentric grooves, and wherein at least one of said plurality of radially spaced concentric grooves in said at least one belleville washer has a length.

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5. The device as set forth in claim 4, wherein said at least one of said plurality of radially spaced concentric grooves in said at least one belleville washer has a depth and a width, and at least one of said width and said depth is uniform along said length.

6. The device as set forth in claim 4, wherein said at least one of said plurality of radially spaced concentric grooves in said at least one belleville washer has a depth and a width, and at least one of said width and said depth varies along said length.

7. The device as set forth in claim 4, wherein said length forms a closed loop.

8. The device as set forth in claim 4, wherein said length forms an open loop.

9. The device as set forth in claim 4, wherein the radial spacing of said plurality of radially spaced concentric grooves is uniform.

10. The device as set forth in claim 4, wherein the radial spacing of said plurality of radially spaced concentric grooves is non-uniform.

11. The device as set forth in claim 4, wherein each of said plurality of radially spaced concentric grooves in said at least one belleville washer has a respective length, a respective depth along said respective length, and a respective width along said respective length, and wherein at least one of said depths is different than at least one other of said depths, and wherein at least one of said widths is different than at least one other of said widths.

12. The device as set forth in claim 11, wherein each of said plurality of radially spaced concentric grooves in said at least one belleville washer is at a respective distance from an outer edge of said at least one belleville washer, wherein said depths increase incrementally with decreasing said distances, and said widths increase incrementally with decreasing said distances.

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13. The device as set forth in claim 1, wherein said at least one spiral slot in said at least one belleville washer comprises a plurality of spaced apart spiral slots, each of which extends from a locus on a peripheral edge of said at least one belleville washer to a locus which is radially in from said peripheral edge.

14. The device as set forth in claim 1, wherein one of said first and second plate members further comprises a post structure extending outwardly from said first surface of said one of said first and second plate members, and which post structure includes a ball-shaped head.

15. The device as set forth in claim 14, wherein said post structure further includes a threaded bore which extends axially from said ball-shaped head toward said first surface of said one of said first and second plate members, and which bore receives therein a threaded set screw such that prior to an insertion of the set screw therein, said bore permits the ball-shaped head to compress radially inwardly, and such that after the insertion of said set screw said ball-shaped head is not readily radially compressible.

16. The device as set forth in claim 15, wherein said at least one belleville washer further comprises a central opening which includes a curvate volume for receiving and holding therein said ball-shaped head.

17. The device as set forth in claim 16, wherein a tightening of said set screw locks said curvate volume with respect to said ball-shaped head.

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18. An intervertebral spacer device comprising:

first and second plates, each having inner and outer surfaces thereof, said plates being disposed in a spaced apart relationship such that the inner surfaces face toward one another, and the outer surfaces face away from one another, said first plate including a retaining wall extending outwardly from said inner surface of said first plate; and

a belleville washer, having narrow and wide ends thereof, disposed with said wide end contacting said inner surface of said first plate within said retaining wall, such that a compressive load applied to the outer surfaces of said plates is counteracted by said belleville washer, said belleville washer including at least one radially spaced concentric groove and at least one spiral slot.

19. The device as set forth in claim 18, wherein said at least one spiral slot in said belleville washer comprises a plurality of spaced apart spiral slots, each of which extends from a locus on a peripheral edge of said belleville washer to a locus which is radially in from said peripheral edge.

20. The device as set forth in claim 18, wherein said at least one radially spaced concentric groove in said belleville washer comprises a plurality of radially spaced concentric grooves, and wherein each of said plurality of radially spaced concentric grooves in said belleville washer has a respective length, a respective depth along said respective length, and a respective width along said respective length, at least one of said respective depth and said respective width being uniform along said respective length.